



September 1, 2011

Weekly Meeting Memo CSE-16

MEMO

TO: Cliff Ogburn, Town of Nags Head, NC

FROM: Haiqing L. Kaczkowski (PE) and Tim W. Kana (PG)

RE: Nags Head Beach Nourishment Project (CSE 2203)

Weekly Project Meeting of the Town, the Contractor, and the Engineer

The weekly project meeting of the Town of Nags Head, the Contractor (Great Lakes Dredge & Dock, referred to as GLDD) and the Engineer (Coastal Science & Engineering, referred to as CSE) was held from 9:05 a.m. to 9:45 a.m. on Thursday, 1 September 2011, at the Town Hall. Items discussed during the meeting are summarized herein.

1) Hurricane Irene Impacts

Hurricane Irene made landfall at Cape Lookout (~75 miles southwest of Nags Head) around 7:30 am on Saturday, August 27th, 2011. By early afternoon, the east edge of the eyewall was in the vicinity of Manteo and generated ocean surge, strong wind and high waves at Nags Head. According to the records of the NOAA wind and tide gauges and the USACE Field Research Facility wave gauge at Duck (NC), at the peak of the storm the wind speed reached 70 mph, the tide level was 3 ft and the significant wave height was 23 ft with a period of 16 seconds.

Before the hurricane, approximately 83 percent of the project was completed along over 40,000 linear feet (~7.7 miles) of beach in Nags Head. As expected, the new nourished beach withstood the storm's impact and acted as a buffer dissipating wave energy. No ocean overwash occurred and no dune escarpment was observed in the project area. It appears that a portion of the newly placed sand was shifted from the visible beach to the inner surf zone. However, it is yet to be determined whether there was any significant sand loss beyond the surf zone. Under normal ocean conditions, the nourished sand on



the construction berm is design to be shifted under water by wave action to reach the beach equilibrium profile. Northeasters or storms like Hurricane Irene accelerate this process.

Regardless of whether or not the storm eroded the beach, the newly placed sand served to absorb wave energy and kept the severe storm impact further from the buildings and roads. Consequently, without this project in place, the damage could have been much worse. The town staff indicated that there has always been ocean overwash somewhere in the town during the past hurricanes. Fifty percent of public beach accesses were severely damaged (beyond repair) under Hurricane Isabel in 2003. But by contrast, there was no ocean overwash and no beach access damage during Hurricane Irene.

2) GLDD Evacuation Due to Hurricane Irene

Seventy two hours prior to Irene's landfall, GLDD's three dredges, the Liberty Island, the Dodge Island and the Padre Island, started leaving the project site to sail for Norfolk (VA) to ride out the coming hurricane. The fill crew broke the pipeline and moved the shore pipes, fill shacks and equipment to the storm staging area at Gray Eagle Street and Surfside Street. Some pipes left at the south end of the project site were stocked safely and placed in the direction facing the ocean. Final after dredging (AD) surveys were taken of the beach to be used for pre-storm volume calculations. By the time the hurricane passed the project site, all construction equipment and pipes were secured and all GLDD site personnel had evacuated to Greenville, NC.

After the passage of the hurricane, the majority of GLDD's land-based personnel returned to Nags Head on Monday, August 29, and the dredge Padre Island left dock in Norfolk (VA) to return to Nags Head on the same day. On Tuesday, August 30, the remainder of GLDD's land-based personnel returned to the job site, and the dredge Dodge Island left Norfolk and sailed back to the job site. GLDD decided not to bring the Liberty Island back to the project site as her portion of project is completed.

Since the dredges and the land-based personnel returned to the job site, GLDD re-assembled the pipeline at the northern part of the project using the landing point near station 535+00. However, due to the persistent north to northeast winds and resulting rough sea conditions, the



dredge crews were unable to make the pump-out connections and to run a water test to check the submerged pipeline. The dredges remain on standby offshore Nags Head. The weather is expected to calm down tomorrow, so the dredging operations may be able to resume soon.

3) CSE On Site Observation During Hurricane Irene and Pre- and Post-Storm Surveys

CSE's personnel remained on site before and during the hurricane. They conducted a pre-storm survey along the visible beach to low water on Tuesday, August 23. CSE and the town staff made site observations during the hurricane passage, and CSE conducted a post-storm survey on the beach the day after the storm. The data collected by CSE before and after the storm were used to calculate the volume loss on the visible beach. Furthermore, on Monday, August 29, CSE collected more than 13,000 data points obtaining comprehensive coverage of the state of the visible beach. This data set will be used to develop a digital terrain model (DTM) which provides a three-dimensional picture of the beach before and after the storm. Unfortunately, rough sea conditions during the past few days hindered offshore data collection, and CSE's personnel are waiting for sea conditions under brisk NE winds to diminish before continuing with this work.

CSE submitted a memorandum to the town regarding Hurricane Irene's impacts. It summarized the wind and tide conditions during the storm, and the major findings from the pre- and post-storm surveys including the volume changes on the visible beach, representative contour changes, and beach slope changes along both the nourished and unnourished sections of the project.

4) GLDD Production To-Date and Future Work Schedule

As of August 24, 2011 (before Hurricane Irene), GLDD finished pumping and placing 3,847,454 cubic yards (cy) of sand onto the project area. The Liberty Island completed 499 loads with a reported volume of approximately 2.2 million cy (almost half of the total contract volume). The dredges Dodge Island and Padre Island completed approximately 70,000 cy of work since their arrival on site.

Once the dredging operation resumes, the Dodge Island and the Padre Island will continue to work as a team and will share the same landing point near station 535+00. They will pick up the work near station 521+00 (just north of the Nags Head Pier), and proceed northward until they reach the project end at station 497+00 near Bonnett Street. After that, the pipe elbow will be



flipped and the operation will proceed southward to station 560+00. Depending on the status of the placement of the submerged pipeline at station 1016+00, the dredges may first go there to finish the last ~30,000 cy of work near the south end of the project, or they may use a new submerged pipeline at station 595+00 near Dune Street to finish the work for the northern portion of the project.

5) Beach Monitoring and Maintenance Plan

The town held an emergency board meeting last Thursday, August 25 before the passage of Hurricane Irene. A beach monitoring and maintenance plan was presented in the meeting and was approved immediately. Such a plan is in accordance with relevant regulations issued by the Federal Emergency Management Agency (FEMA). The town has been taking steps to ensure that they are compliant with FEMA criteria to replace material that could be lost due to storm erosion between the dune line and 19 ft below mean sea level.

6) Sea Turtle Monitoring on the Beach

Sea turtle monitoring on the beach was suspended after GLDD's evacuation on Tuesday, August 23, and resumed a week later on Tuesday, August 30. The turtle monitor coordinator will schedule appropriate numbers of monitors according to GLDD's work schedule.

7) Ocean Outfall Extension Project

Before the storm passage, the beach nourishment project covered the section of the outfall located near Curlew Street. Due to the beach profile changes after the storm, the town is seeking clarification from NCDOT regarding whether or not they should stay with the original designs.

8) Anticipated events and schedule for next week

*Thursday, 8 September, at 9 a.m. — Weekly project meeting at the Town Hall
(The Town, the Contractor, and the Engineer are expected to attend.)*

Enclosure: List of attendees and their contact information